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10/814,077	03/31/2004	Kenichi Takano	HT03-015	5500

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EXAMINER
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RENNER, CRAIG A

ART UNIT	PAPER NUMBER
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2627

DATE MAILED: 08/18/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/814,077

Applicant(s)

TAKANO ET AL.

Examiner

Craig A. Renner

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-6 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 March 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>6/21/04 &amp; 8/11/04</u> . | 6) <input type="checkbox"/> Other: ____.  |

## DETAILED ACTION

### *Drawings*

1. The drawings are objected to because of the following informalities:

a. The drawings fail to comply with 37 CFR 1.84(p)(4) because a single reference sign has been used to designate plural distinct elements in the figures. Note, for instance, that “**20**” has been used to designate both a “lower soft layer” (as shown in FIG. 1, for instance, and as initially disclosed in line 11 on page 3, for instance) and a “main pole” (as shown in FIGS. 2a and 2b, for instance, and as initially disclosed in line 10 on page 8, for instance); and “**30**” has been used to designate both a “upper hard layer” (as shown in FIG. 1, for instance, and as initially disclosed in line 12 on page 3, for instance) and a “write gap layer” (as shown in FIGS. 2a and 2b, for instance, and as initially disclosed in line 13 on page 8, for instance).

b. In FIGS. 3a and 4a, each instance of “Perendicular” should be spelled --Perpendicular--.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) and/or an amendment to the specification in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the

changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Specification***

2. The disclosure is objected to because of the following informalities:
  - a. In lines 5-7 on page 1, the "RELATED APPLICATION" section should be updated/completed.
  - b. In line 15 on page 3, "a gap between them (19)" should be changed to -- a gap (19) between them-- for better clarity.

Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
4. Claims 1-6 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
  - a. Many elements in the claims are indefinite because they lack clear and/or positive antecedent basis including "the ABS plane" (lines 4 and 9 in claim 1, for

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instance), "the main pole" (line 1 of claim 4), "the ferromagnetic materials..." (lines 2-4 of claim 4), and "the insulating material..." (lines 1-2 of claim 6).

b. In lines 6-7, 7-8, 8 and 10 of claim 1, it is indefinite as to whether each instance of "said stitched write shield" refers to that set forth in line 1 of independent claim 1, or that set forth in line 5 of independent claim 1.

c. In line 1 in each of claims 2-6, it is indefinite as to whether "The PMR head" refers to that set forth in line 1 of independent claim 1, or that set forth in line 2 of independent claim 1.

d. In lines 2-3 of claim 4, it is indefinite as to whether "the stitched shield" refers to that set forth in line 1 of independent claim 1, or that set forth in line 5 of independent claim 1.

### ***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claim 1 is rejected under 35 U.S.C. 102(e) as being anticipated by Hsu et al. (US 2005/008671).

Hsu teaches a perpendicular magnetic recording head (26B, for instance) with a stitched write shield (44B) comprising a perpendicular magnetic recording head (26B) having a magnetic pole (42) and a main write shield (44A) formed symmetrically above the magnetic pole (as shown in Fig. 5, for instance), the main write shield having a leading edge (immediately adjacent 44B) and the pole having a trailing edge (adjacent 44B) with a trailing edge width in the ABS plane (as shown in Fig. 5, for instance); a stitched write shield (44B) formed symmetrically on the leading edge of the main write shield (as shown in Fig. 5, for instance) and symmetrically above the magnetic pole (as shown in Fig. 5, for instance), the trailing edge of the stitched write shield contacting the leading edge of the main write shield (as shown in Fig. 5, for instance) and the stitched write shield having a thickness (as shown in Fig. 5, for instance) and the stitched write shield having a leading edge with a leading edge width in the ABS plane (as shown in Fig. 5, for instance); and a write gap layer (between 42 and 44B) formed between the leading edge of the stitched write shield and the trailing edge of the magnetic pole (as shown in Fig. 5, for instance).

7. Claims 1 and 3 are rejected under 35 U.S.C. 102(e) as being anticipated by Taguchi (US 2004/0212923).

Taguchi teaches a perpendicular magnetic recording head (40, for instance) with a stitched write shield (421) comprising a perpendicular magnetic recording head (40) having a magnetic pole (41) and a main write shield (42) formed symmetrically above the magnetic pole (as shown in FIG. 2, for instance), the main write shield having a

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leading edge (immediately adjacent 421) and the pole having a trailing edge (adjacent 421) with a trailing edge width in the ABS plane (as shown in FIG. 2, for instance); a stitched write shield (421) formed symmetrically on the leading edge of the main write shield (as shown in FIG. 2, for instance) and symmetrically above the magnetic pole (as shown in FIG. 2, for instance), the trailing edge of the stitched write shield contacting the leading edge of the main write shield (as shown in FIG. 2, for instance) and the stitched write shield having a thickness (as shown in FIG. 2, for instance) and the stitched write shield having a leading edge with a leading edge width in the ABS plane (as shown in FIG. 2, for instance); and a write gap layer (between 41 and 421) formed between the leading edge of the stitched write shield and the trailing edge of the magnetic pole (as shown in FIG. 2, for instance) [as per claim 1]; wherein the stitched write shield thickness is between approximately 0 and 1.0 microns (as shown in FIG. 3, for instance, i.e., the stitched write shield thickness includes values within the claimed range as the stitched write shield thickness varies down to 0 microns in FIG. 3) [as per claim 3].

8. Claims 1, 4, and 6 are rejected under 35 U.S.C. 102(e) as being anticipated by Lille (US 2005/0068673).

Lille teaches a perpendicular magnetic recording head (800) with a stitched write shield (802) comprising a perpendicular magnetic recording head (800) having a magnetic pole (826) and a main write shield (890/1302) formed symmetrically above the magnetic pole (as shown in FIG. 8, for instance), the main write shield having a leading

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edge (immediately adjacent 802) and the pole having a trailing edge (adjacent 802) with a trailing edge width in the ABS plane (888); a stitched write shield (802) formed symmetrically on the leading edge of the main write shield and symmetrically above the magnetic pole (as shown in FIG. 8, for instance), the trailing edge of the stitched write shield contacting the leading edge of the main write shield (as shown in FIGS. 8 and 12, for instance) and the stitched write shield having a thickness (as shown in FIG. 12, for instance) and the stitched write shield having a leading edge with a leading edge width in the ABS plane (as shown in FIG. 8, for instance); and a write gap layer (828) formed between the leading edge of the stitched write shield and the trailing edge of the magnetic pole (as shown in FIGS. 8 and 12, for instance) [as per claim 1]; wherein the main pole, the main shield and the stitched shield are formed of the ferromagnetic materials Fe, Co, CoNiFe, FeCo, NiFe, their composites, their oxygen or nitrogen doped composites, their amorphous forms or their multi-layered laminates which may include the insertion of non-magnetic layers (lines 13-16 in paragraph [0042], lines 11-13 in paragraph [0051], and lines 12-13 in paragraph [0043], for instance, i.e., "NiFe", for instance) [as per claim 4]; and wherein the write gap layer is formed of the insulating material alumina (lines 2-3 in paragraph [0042], for instance), to a thickness between approximately 0.04 and 0.16 microns (lines 10-12 in paragraph [0045], for instance) [as per claim 6].



***Claim Rejections - 35 USC § 103***

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

11. Claims 2, 3, and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hsu et al. (US 2005/008671).

Hsu teaches the perpendicular magnetic recording head as detailed in paragraph 6, supra. Hsu, however, remains silent as to half the difference between the stitched write shield leading edge width and the magnetic pole trailing edge width being "between approximately 0 and 0.1 microns" as per claim 2, the stitched write shield thickness being "between approximately 0 and 1.0 microns" as per claim 3, and the stitched write shield thickness being "between approximately 0 and 1.0 microns," the stitched write shield leading edge width being "between approximately 0.1 and 0.22 microns" and the magnetic pole trailing edge width being "between approximately 0.1 and 0.2 microns" as per claim 5.

Official notice is taken of the fact that it is notoriously old and well known in the head art to modify the parameters of head components during the course of routine optimization/experimentation. It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have had half the difference between the stitched write shield leading edge width and the magnetic pole trailing edge width of Hsu be between approximately 0 and 0.1 microns, the stitched write shield thickness of Hsu be between approximately 0 and 1.0 microns, the stitched write shield leading edge width of Hsu be between approximately 0.1 and 0.22 microns, and the magnetic pole trailing edge width of Hsu be between approximately 0.1 and 0.2 microns. The rationale is as follows:

One of ordinary skill in the art would have been motivated to have had half the difference between the stitched write shield leading edge width and the magnetic pole trailing edge width of Hsu be between approximately 0 and 0.1 microns, the stitched write shield thickness of Hsu be between approximately 0 and 1.0 microns, the stitched write shield leading edge width of Hsu be between approximately 0.1 and 0.22 microns, and the magnetic pole trailing edge width of Hsu be between approximately 0.1 and 0.2 microns since such ranges, absent any criticality (i.e., unobvious and/or unexpected result(s)), are generally achievable through routine optimization/experimentation, and since discovering the optimum or workable ranges, where the general conditions of a claim are disclosed in the prior art, involves only routine skill in the art, *In re Aller*, 105 USPQ 233 (CCPA 1955). Moreover, in the absence of any criticality (i.e., unobvious and/or unexpected result(s)), the parameter set forth above would have been obvious to


a person having ordinary skill in the art at the time the invention was made, *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

### ***Conclusion***

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Craig A. Renner whose telephone number is (571) 272-7580. The examiner can normally be reached on Monday-Tuesday & Thursday-Friday 9:00 AM - 7:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoa T. Nguyen can be reached on (571) 272-7579. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

  
Craig A. Renner  
Primary Examiner  
Art Unit 2627

CAR